THE CLAIMS

WE CLAIM

1. (CURRENTLY AMENDED) [A] In a digital radiography imaging system using the projected distorted image shape of an element having a known geometry onto a radiation detector for comparison against a known non-distorted projected image shape of the element in order to generate a corrective transformation for image data representing the image to correct distortions in an image, a radiation sensor [for use with a digital radiography imaging system] for intraoral placement in a mouth of a patient for production of radiographs of teeth and supporting structures, said sensor comprising:

a housing containing at least one generally planar, radiation detector providing an imaging surface oriented toward a radiation source, said housing conforming to the anatomic curvatures of the human maxillary and mandibular arches of the average patient; and,

at least one radio-opaque fiduciary element of known shape, size and location having a known projected image shape produced by a known angle of incidence between the radiation source and said imaging surface [positioned] intermediate the radiation source and the surface of said at least one radiation detector, said at least one fiduciary element casting a projected image on said at least one radiation detector when illuminated by a radiation source for determining an unknown angle of incidence between the radiation source and said imaging surface by comparing the projected image shape of the fiduciary element against the projected

image shape of the fiduciary element generated by a known angle of incidence to correct for projective distortion in the projected image shape caused by the unknown angle of incidence.

2. (ORIGINAL) A radiation sensor as in claim 1 wherein said housing contains at least two, generally planar, radiation detectors abutting at a non-zero angle to form a faceted, generally contiguous imaging surface oriented toward the radiation source, said angle selected to conform said housing to the anatomic curvatures of the human maxillary and mandibular arches of the average patient.

3. (ORIGINAL) A radiation sensor as in claim 2 wherein each adjoining pair of said generally planar detectors abut one another at a fixed angle.

4. (ORIGINAL) A radiation sensor as in claim 2 wherein each pair of adjoining generally planar radiation detectors are flexibly joined so that the angle at which they abut can be changed to conform said housing to the anatomic curvatures of the human maxillary and mandibular arches of the average patient.

5. (ORIGINAL) A radiation sensor as in claim 2 wherein said fiduciary element is a sphere.

6. (ORIGINAL) A radiation sensor as in claim 1 wherein said fiduciary element has a shape whose projected image on the surfaces of said radiation detectors includes at least two intersecting line segments.

7. (ORIGINAL) A radiation sensor as in claim 1 further comprising at least one radio-opaque fiduciary element of known shape, size and location embedded on, in or

under said housing intermediate the radiation source and the surface of each of said at least one radiation detectors, said at least one fiduciary element casting a projected image on said at least one radiation detectors when illuminated by an x-ray source.

8. (ORIGINAL) A radiation sensor as in claim 1 wherein said housing further having a holding tab protruding therefrom for retention between the teeth for holding the radiation detectors in a fixed position in the patient's mouth.

9. (CURRENTLY AMENDED) A radiation sensor for use with a digital radiography imaging system for intraoral placement in a mouth of a patient for production of radiographs of teeth and supporting structures, said sensor comprising:

a housing [containing] having integrally formed therewith at least two, generally planar, digital radiation detectors abutting at a non-zero angle to form a faceted, generally contiguous imaging surface oriented toward [the] a radiation source, said angle selected to conform said housing to the anatomic curvatures of the human maxillary and mandibular arches of the average patient, said teeth and supporting structures casting a projected image on said at least two radiation detectors when illuminated by [a] the radiation source.

10. (ORIGINAL) A radiation sensor as in claim 9 wherein each adjoining pair of said generally planar detectors abut one another at a fixed angle.

11. (ORIGINAL) A radiation sensor as in claim 9 wherein each pair of adjoining generally planar radiation detectors are flexibly joined so that the angle at which they

abut can be changed to conform said housing to the anatomic curvatures of the human maxillary and mandibular arches of the average patient.

12. (ORIGINAL) A radiation sensor as in claim 9 wherein said housing further having a holding tab protruding therefrom for retention between the teeth for holding the radiation detectors in a fixed position in the patient's mouth.

13. (CURRENTLY AMENDED) A method for correcting distortions in a radiation sensor used with a digital radiography imaging system for intraoral placement in a mouth of a patient for production of radiographs of teeth and their anatomical supporting structures of bone, periodontal ligaments and gingiva around the root and cervical region of the tooth, said method comprising the steps of:

Providing a housing containing at least one generally planar, radiation detector providing an imaging surface oriented toward a radiation source, said housing conforming to the anatomic curvatures of the human maxillary and mandibular arches of the average patient;

Placing at least one radio-opaque fiduciary element of known shape, size and location [positioned] intermediate a radiation source and the surface of said at least one radiation detector, said at least one fiduciary element casting a projected image on said at least one radiation detector when illuminated by the radiation source.

Exposing said at least one radiation detector and said at least one fiduciary element to the radiation source to project an image of said at least one fiduciary

element and said teeth and supporting structures onto the surface of said at least one radiation detector;

Capturing and digitizing the data representing the projected image of the fiduciary element, teeth and their anatomical supporting structures images of bone, periodontal ligaments and gingiva around the root and cervical region of the tooth on the surface of said at least one radiation detector produced by the radiation detector;

Analyzing the digitized image data to determine the distortion of the projected fiduciary [shape] image onto the surface of the at least one radiation detectors due to the non-perpendicularity of the radiation source with respect to the surface of the at least one radiation detectors from that of [a] an ideal fiduciary image projected onto the surfaces of the at least one radiation detectors defined by exposure of the fiduciary element to a radiation source perpendicular to the surface of the at least one radiation detectors, and determining a corrective transformation that transforms the distorted projected fiduciary [shape] image to that of the ideal fiduciary [shape] image; and,

Applying the corrective transformation to the remaining digitized image data in order to transform the distorted projected image of the teeth and their anatomical supporting structures of bone, periodontal ligaments and gingiva around the root and cervical region of the tooth to that of an ideal projected image of the teeth and their anatomical supporting structures of bone, periodontal ligaments and gingiva around the root and cervical region of the tooth.

14. (ORIGINAL) A method as in claim 13 further including the step of:

Placing a radio-opaque fiduciary element of known shape, size and location intermediate the radiation source and the surface of each one of said at least one radiation detectors.

15. (ORIGINAL) A method as in claim 14 wherein the step of placing at least one radio-opaque fiduciary element of known shape, size and location intermediate the radiation source and the surface of each one of said at least one radiation detectors, further includes the step of:

Embedding on, or placing in or under said housing at least one radio-opaque fiduciary element of known shape, size and location intermediate the radiation source and the surfaces of each of said at least one radiation detectors, said at least one fiduciary element casting a projected image on the surfaces of said at least one radiation detectors.